



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

21874 7590 03/25/2004
EDWARDS & ANGELL, LLP
P.O. BOX 55874
BOSTON, MA 02205

EXAMINER	
VARGAS, DIXOMARA	
ART UNIT	PAPER NUMBER
2859	
DATE MAILED: 03/25/2004	

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,771	03/30/2001	Ray F. Lee	49946 (71699)	6965

TITLE OF INVENTION: APPARATUS FOR MAGNETIC RESONANCE IMAGING HAVING A PLANAR STRIP ARRAY ANTENNA INCLUDING SYSTEMS AND METHODS RELATED THERETO

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	06/25/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

- ☐ Applicant claims SMALL ENTITY status.
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to : Mail

**Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
(703) 746-4000**

or Fax

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

21874 7590 03/25/2004

**EDWARDS & ANGELL, LLP
P.O. BOX 55874
BOSTON, MA 02205**

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,771	03/30/2001	Ray F. Lee	49946 (71699)	6965

TITLE OF INVENTION: APPARATUS FOR MAGNETIC RESONANCE IMAGING HAVING A PLANAR STRIP ARRAY ANTENNA INCLUDING SYSTEMS AND METHODS RELATED THERETO

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$300	\$1630	06/25/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
VARGAS, DIXOMARA	2859	324-318000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
- ☐ Publication Fee
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.**

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE(S)



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/822,771	03/30/2001	Ray F. Lee	49946 (71699)	6965
21874	7590	03/25/2004	EXAMINER	
EDWARDS & ANGELL, LLP P.O. BOX 55874 BOSTON, MA 02205			VARGAS, DIXOMARA	
			ART UNIT	PAPER NUMBER
			2859	
DATE MAILED: 03/25/2004				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 73 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 73 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

Notice of Allowability	Application N .	Applicant(s)	
	09/822,771	LEE, RAY F.	
	Examiner	Art Unit	
	Dixomara Vargas	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment filed 02/06/04.
2. ☒ The allowed claim(s) is/are 1-62.
3. ☒ The drawings filed on 03/30/01 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with William Daley on March 15, 2004.

The application has been amended as follows:

In claim 1:

1. A device for detecting ~~near field electromagnetic~~ magnetic resonance signals, comprising a strip array antenna, wherein the strip array antenna includes: a plurality of conductors arranged so a long axis of each is in parallel and spaced from each other, each conductor forming an independent detector element of the strip antenna; and a ground plane that is arranged so that each of the plurality of conductors is spaced from one side of the ground plane; and wherein a length of each conductor is set so as to substantially reduce coupling of a magnetic resonance signal in one of the plurality of conductors to an adjacent conductor(s) independent of the spacing between adjacent conductors.

Art Unit: 2859

In claim 20:

20. A device for detecting ~~near-field-electromagnetic~~ magnetic resonance signals, comprising a strip array antenna, wherein the strip array antenna includes: X conductors arranged so a long axis of each is in parallel and spaced from each other, where X is an integer ≥ 2 , each of the X conductor forming an independent detector element of the strip antenna; wherein a length of each conductor is set to be equal to be about $n\lambda/4$, where n is an integer ≥ 1 and λ is the wavelength of the signal to be detected, thereby reducing coupling of a magnetic resonance signal in one of the X conductors to an adjacent conductor(s) independent of the spacing between adjacent conductors; an encapsulation member, wherein the encapsulation member includes: a substrate, on one surface of which is disposed the X conductors, a ground plane that is disposed on an opposing surface of the substrate, an overlay that covers the X conductors disposed on the substrate, and wherein the substrate and the overlay are of a material having a dielectric constant so the wavelength of the electromagnetic wave on each conductor is reduced so as to be in a desired range; and wherein each of the X conductors is terminated in a manner so that electromagnetic wave on each of the conductors is one of a standing wave or traveling wave.

In claim 30:

30. A ~~near-field-electromagnetic~~ magnetic resonance signals detection apparatus, comprising: a strip array antenna and Y receivers, where Y is an integer ≥ 1 ; wherein the strip array antenna includes: X conductors arranged so a long axis of each is in parallel and spaced from each other, where X is an integer ≥ 2 and where each of the X conductors forms an independent detector element of a strip array antenna, and a ground plane that is arranged so that each of the X

Art Unit: 2859

conductors is spaced from one side of the ground plane, and wherein a length of each conductor is set so as to substantially reduce coupling of a magnetic resonance signal in one of the X conductors to an adjacent conductor(s) independent of the spacing between adjacent conductors, and wherein the Y receivers are operably coupled to the X conductors so as to receive output signals from the X conductors.

In claim 45:

45. A method for detecting ~~near-field electromagnetic~~ magnetic resonance signals from a region, comprising the steps of: providing a strip array antenna that includes: X conductors arranged so a long axis of each is in parallel and spaced from each other, where X is an integer ≥ 2 and where each of the X conductors forms an independent detector element of a strip array antenna, and a ground plane that is arranged so that each of the X conductors is spaced from one side of the ground plane, and setting a length of each conductor to substantially reduce coupling of a magnetic resonance signal in one of the plurality of conductors to an adjacent conductor(s) independent of the spacing between adjacent conductors.

Allowable Subject Matter

2. Claims 1- 62 are allowed.
3. The following is an examiner's statement of reasons for allowance:
 - a. With respect to claims 1 and 30, the claims have been found allowable over the prior art because the prior art fails to teach or fairly suggest a device for detecting MR signals comprising: a device for detecting magnetic resonance signals comprising: a

ground plane that is arranged so that each of the plurality of independent detector conductors is spaced from one side of the ground plane; and wherein a length of each conductor is set so as to substantially reduce coupling of a magnetic resonance signal in one of the plurality of conductors in combination with the remaining limitations of the claim.

b. With respect to claim 20, the claim has been found allowable over the prior art because the prior art fails to teach or fairly suggest a device for detecting MR signals comprising: a device for detecting magnetic resonance signals comprising: an independent detector element of the strip antenna wherein a length of each conductor is set to reduce coupling of a magnetic resonance signal in one of the X conductors, and an encapsulation member, wherein the encapsulation member includes: a substrate, on one surface of which is disposed the X conductors, a ground plane that is disposed on an opposing surface of the substrate, an overlay that covers the X conductors disposed on the substrate in combination with the remaining limitations of the claim.

c. With respect to claim 40, the claim has been found allowable over the prior art because the prior art fails to teach or fairly suggest an MRI excitation and detection apparatus to scan a region of an object comprising: a ground plane that is arranged so that each of the plurality of independent detector conductors is spaced from one side of the ground plane; and wherein a length of each conductor is set so as to substantially reduce coupling of a magnetic resonance signal in one of the plurality of conductors in combination with the remaining limitations of the claim.

d. With respect to claim 42, the claim has been found allowable over the prior art because the prior art fails to teach or fairly suggest an MRI system to scan a region of an object comprising: a ground plane that is arranged so that each of the plurality of independent detector conductors is spaced from one side of the ground plane; and wherein a length of each conductor is set so as to substantially reduce coupling of a magnetic resonance signal in one of the plurality of conductors in combination with the remaining limitations of the claim.

e. With respect to claim 45, the claim has been found allowable over the prior art because the prior art fails to teach or fairly suggest a method for detecting MR signals from a region, comprising the steps of: providing a strip antenna that includes a ground plane that is arranged so that each of the plurality of independent detector conductors is spaced from one side of the ground plane; and setting a length of each conductor to substantially reduce coupling of a magnetic resonance signal in one of the plurality of conductors in combination with the remaining limitations of the claim.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

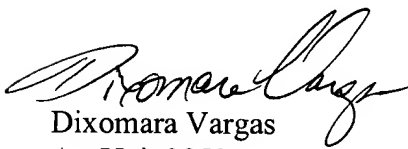
Art Unit: 2859

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (571) 272-2252. The examiner can normally be reached on 8:00 am. to 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dixomara Vargas
Art Unit 2859
March 16, 2004



Diego Gutierrez
Supervisory Patent Examiner
Technology Center 2800